

## Optimal Design for SARMA(P,Q)L Process of EWMA Control Chart

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**Abstract :** The main goal of this paper is to study Statistical Process Control (SPC) with Exponentially Weighted Moving Average (EWMA) control chart when observations are serially-correlated. The characteristic of control chart is Average Run Length (ARL) which is the average number of samples taken before an action signal is given. Ideally, an acceptable ARL of in-control process should be enough large, so-called (ARL<sub>0</sub>). Otherwise it should be small when the process is out-of-control, so-called Average of Delay Time (ARL<sub>1</sub>) or a mean of true alarm. We find explicit formulas of ARL for EWMA control chart for Seasonal Autoregressive and Moving Average processes (SARMA) with Exponential white noise. The results of ARL obtained from explicit formula and Integral equation are in good agreement. In particular, this formulas for evaluating (ARL<sub>0</sub>) and (ARL<sub>1</sub>) be able to get a set of optimal parameters which depend on smoothing parameter ( $\lambda$ ) and width of control limit (H) for designing EWMA chart with minimum of (ARL<sub>1</sub>).

**Keywords :** average run length, optimal parameters, exponentially weighted moving average (EWMA), control chart

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